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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/826,741	04/16/2004	Nan-Kuang Chen	DEE-PT167	1361
3624	7590	09/26/2005	EXAMINER	
VOLPE AND KOENIG, P.C. UNITED PLAZA, SUITE 1600 30 SOUTH 17TH STREET PHILADELPHIA, PA 19103			PEACE, RHONDA S	
			ART UNIT	PAPER NUMBER
			2874	

DATE MAILED: 09/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/826,741

Applicant(s)

CHEN ET AL.

Examiner

Rhonda S. Peace

Art Unit

2874

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6, 7, 11 and 12 is/are rejected.
- 7) ☒ Claim(s) 4, 5 and 8-10 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____.  |

## DETAILED ACTION

### *Priority*

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

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not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 3, 6, 7, 11, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barclay et al in the article ""Experimental Demonstration of Evanescent Coupling from Optical Fibre Tapers to Photonic Crystal Waveguides."

Pertaining to claims 1, 2, and 12, P.E. Barclay et al, in the article "Experimental demonstration of Evanescent Coupling from Optical Fibre Tapers to Photonic Crystal Waveguides," published by Electronic Letters Online, describes the evanescent coupling between a photonic crystal waveguide (a photonic crystal material) and a tapered optical fiber having a photonic band-gap, where the taper of the optical fiber is placed parallel to the photonic crystal waveguide at a close distance (Introduction: lines 11-14). Barclay et al exhibits with experimental data that evanescent coupling occurs when the distance between the two structures is less than 3.10 micrometers, and highly efficient evanescent coupling occurs at separation distances of 1.10 micrometers or less (Results: paragraph 1 lines 1-9, Figure 3). Barclay et al proposes this highly efficient evanescent coupling occurs from an optical fiber to a confined photonic crystal when the core of the fiber is in close proximity of the photonic crystal waveguide. The results of Barclay et al suggest the fiber core must be close to the photonic crystal waveguide to produce evanescent coupling, and thereby a fiber polished, using a polishing method, nearly to its core would be a suitable replacement for a tapered optical fiber. Both using a tapered fiber and using a fiber polished, using a polishing method, near to the core

exhibit the same fundamental characteristic that allows evanescent coupling, namely the close proximity between the photonic crystal material and the optical fiber core, and for this reason it would have been obvious to one of ordinary skill in the art to utilize a fiber that has been polished, using a polishing method, nearly to the core of the fiber instead of a tapered fiber. In addition, the use of a polished fiber simplifies the production process, as it eliminates the process of drawing and tapering the fiber. In addition, Barclay et al discusses how variations in the separation distance between the tapered fiber and the photonic material causes changes in the amount of effective evanescent coupling between the two structures (Results: paragraph 1 lines 1-9, Figure 3). These changes in separation distance are analogous to changes within the photonic band-gap, and thereby, both changes in separation distance and photonic band-gap will cause a change in the specific wavelengths returning to the tapered fiber from the photonic material (Results: paragraph 1 lines 1-7, Figure 3). For this reason, it would have been obvious to alter the photonic band-gap, by changing the separation distance or other means, as doing so has proven to change the wavelength reflected back into the fiber from the photonic material. It is also to be noted, the limitation of claim 1 stating, "(said) photonic band-gap is adjusted to reflect a specific wavelength returning to (said) fiber" is a functional limitation within a structural claim and therefore has not been given patentable weight (*In re Fuller*, 1929 C.D. 172; 388 O.G. 279). Finally, it is noted by the examiner that both claims 1 and 12 contain the same structural limitations, and therefore there is no patentable distinction between the tunable filter of claim 1 and the intensity modulator of claim 12. The applicant is reminded that it has been held that

a preamble is denied the effect of a limitation where the claim is drawn to a structure and the portion of the claim following the preamble is a self-contained description of the structure not depending for completeness upon the introductory clause (*Kropa v. Robie*, 88 USPQ 478 (CCPA 1951)).

With reference to claim 3, Barclay et al discloses the photonic crystal previously described has plural cavities and air is used as filler in these cavities (Design, Fabrication, and Test Setup: paragraph 1 lines 1-8, Figure 1a).

Regarding claims 6 and 7, Barclay et al shows the photonic crystal structure being tested has plural cavities arranged in a periodic manner and are parallel to the core of the fiber taper (Introduction: paragraph 1 lines 11-14, Design, Fabrication, and Setup: paragraph 1 lines 1-8, Figure 1a).

Speaking to claim 11, the applicant has claimed the photonic band-gap is either a complete photonic band-gap or an incomplete photonic band-gap. While Barclay et al makes no reference to the "completeness" of the photonic band-gap existing in the experiments previously discussed, however it would have been obvious to one of ordinary skill in the art to use a system (optical fiber and photonic crystal material) having either a complete photonic band-gap or an incomplete photonic band-gap, as all photonic band-gaps can be classified as either complete or incomplete.

Applicant cannot rely upon the foreign priority papers to overcome this rejection because a certified English translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

***Allowable Subject Matter***

Claims 4, 5, and 8-10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The most applicable pieces of prior art discussed within this action do not disclose, nor do they reasonably suggest an optical tunable filter having a photonic crystal material attached to a polished surface of the fiber, where evanescent coupling is utilized to reflect a specific wavelength into the fiber wherein the following limitations are met: the filler used is an electro-optical polymer or that the filler used (aside from an electro-optical polymer) is adjusted by either volume or n-value, and the plural cavities are arranged perpendicular to the fiber's core. As the applicant's invention has exhibited the novelty of forming the photonic crystal upon a polished surface of the fiber with an electro-optical polymer to give the filter tunable capabilities, among the other limitations previously discussed which are not met by the prior art, it is the opinion of the examiner that claims 4, 5, and 8-10 are patentable, if re-written in independent form including all of the limitations of the base claim and any intervening claims.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

**Conclusion**

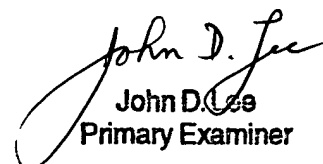
The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Deliwala (US 6944369) discloses an optical coupler having an evanescent coupling region where a photonic crystal structure is formed within a planar waveguide, instead of upon a polished surface of the fiber.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rhonda S. Peace whose telephone number is (571) 272-8580. The examiner can normally be reached on M-F (8-5).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on (571) 272- 2344. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Rhonda S. Peace

  
John D. Lee  
Primary Examiner